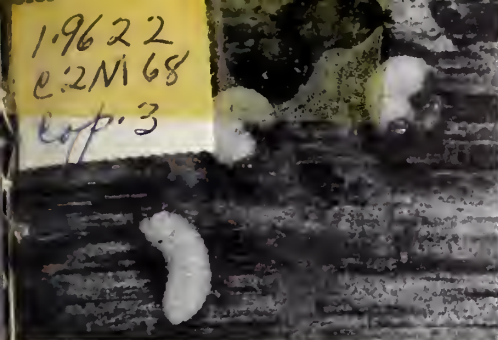


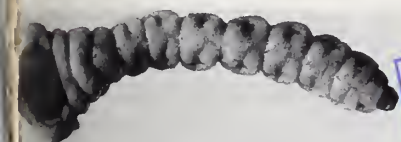
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BARK BEETLE LARVAE



WOOD BORER LARVAE



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BEETLES and BURNED TIMBER

Forest fires in 1959 killed more than 800 million board feet of merchantable timber in California. The fires have long since cooled. The loss of timber promises to continue. Why? For two primary reasons: (1) Fire-injured trees often give rise to bark beetle outbreaks in nearby green timber; (2) fire-killed trees are favored hosts of wood boring insects, an important cause of wood deterioration.

The danger from bark beetles in 1960 is greatest in pine timber of the mixed conifer belt, where some of the most disastrous fires occurred. Damage from wood borers, on the other hand, can be expected in practically all kinds of fire-killed timber throughout the State.

Bark Beetles

Bark beetles pose the worst threat, especially this year. Climatic conditions in California have favored the beetles for the past two years. In some parts of the State these insects are already extremely abundant, and everywhere beetle populations are high. Therefore, the tendency for infestations to "snowball" soon after a fire is stronger than normal. Extensive tree-killing is likely. And since most bark beetles transmit wood-staining fungi, they also help to reduce wood quality in the trees they kill.

Enemy number one is the western pine beetle in ponderosa pine. Number two is the mountain pine beetle in sugar pine. Both are abetted by the red turpentine beetle, which commonly attacks the base of weakened trees. In Douglas-fir, the flatheaded fir borer and the Douglas-fir beetle are the most destructive.

Bark beetle outbreaks after fires follow no set pattern. Usually, though, they start in weakened trees--not dead ones. Beetles that breed in fire-damaged trees move into surrounding undamaged timber or into islands of green timber skipped by the fire. If a fire occurs early in the season, concentrations of beetles generally begin to develop around it the same year. But if a fire occurs late in the season, the beetles will not start to concentrate until the next summer. In either case the beetles usually require two years after the fire to reach their maximum destructiveness.

About half of California's major timber fires in 1959 took place in the spring or summer, the remainder in the fall. Around some of the early burns, infestations started that year. The late ones remained uninfested overwinter, but attacks can be expected to start this spring, and infestations to build up for the next 18 months.

How can we keep these buildups from happening? The best answer is to beat the beetles to the punch by logging trees that are potential beetle producers before they become infested.

The potential for attack is closely tied in with degree of defoliation and cambium injury from fire. Both types of injury should be taken into account in marking burned timber for salvage logging. Several studies show that percent defoliation is a fairly good indicator of the probability of beetle-caused loss in ponderosa pine that survives a fire:

Percent defoliation:	Percent of trees killed by beetles
0-25	0-15
25-50	13-14
50-75	19-42
75-100	45-87

Sometimes it is impractical to log the trees the beetles will attack. And salvage-logging often must leave small or inaccessible trees that may become infested. Then we may have to fell the infested trees and spray them with insecticides or burn them to prevent infestations from spreading.

Infested trees may be hard to spot the first summer after a fire because beetle-killed and fire-killed trees look much alike. Later, differences are easier to see. It is important to keep looking for infested trees.

Wood Borers

Wood borers breed only in dead trees and are not quite as prolific as bark beetles, but directly or indirectly, they do much to destroy wood quality. The larvae bore through the wood, creating "worm holes" which degrade lumber values. They also introduce stain and decay-producing organisms which ultimately make the wood unfit for use.

The most destructive wood borers belong to two families of beetles: the roundheaded borers and the flatheaded borers. Both groups contain a great many species, some of which are attracted to fire-killed timber even before the fire is out.

With wood borers, as with bark beetles, prompt logging will help keep damage to a minimum. This is especially important for timber killed in summer fires. On unlogged 1959 summer burns, for example, borers already will be well established. But timber killed in the fall probably will not be hit until late this spring.

Once borers are established, they often continue to develop after the trees have been logged. Consequently, the logs should be milled as rapidly as possible. A few borers continue to develop even after the logs are manufactured into lumber. One species in particular (Arhopalus productus (Lec.)) often becomes a serious problem in fire-killed Douglas-fir. Kiln-drying for 6 to 8 hours at 140° F. and 70 to 80 percent relative humidity will kill these borers in timber up to 2 inches thick.

To Sum Up

1. Damage from bark beetles and wood boring insects can be expected to be especially severe this year and next around 1959 timber fires.
2. Logging fire-weakened trees before they are infested by bark beetles, and fire-killed trees before they are riddled by borers will help keep losses down.
3. Close surveillance of burned timber lands and prompt detection of bark beetle outbreaks will help show where insect control is needed. Report infestations through the cooperative forest pest detection survey.

--R. E. Stevens and R. C. Hall



